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National Seaweed Program

Ma. Salvacion R. Ferrer

Bureau of Fisheries and Aquatic Resources
860 Arcadia Bldg., Quezon Ave., Quezon City, Philippines
Email: evlas99@hotmail.com

One of the priority thrusts of the Government under the Agrikulturang Makamasa Program for Fisheries is the development, utilization and management of the seaweed resource in the Philippines. Seaweed is one of the major fisheries commodities targeted to enhance the country's economic stability. The importance of seaweed can be seen in two perspectives, that of ecological and economic importance. In terms of ecological importance, seaweed is one of the primary producers in the marine ecosystem and it also serves as habitat and breeding ground for many marine organisms. Economically, seaweed is an important source of human food and raw materials for phycocolloid production, such as carrageenan, agar and algin. Several reports and studies revealed that seaweeds are also used as fodder, fertilizer and for waste water treatment (i.e. biofiltration, bioremediation). In totality, the seaweed resource contributes substantially to the country's fisheries production, trade and employment.

To support and achieve the Government's vision and mission in the new millennium, the Department of Agriculture (DA) through the Bureau of Fisheries and Aquatic Resources (BFAR) conceived and implemented a five-year (1996-2000) Seaweed Development Program (SDP) (Figure 1). The BFAR recognized the many uses and great contributions of seaweed in Philippine economy and would like to sustain the present position of *Kappaphycus/Eucheuma* and its natural product in the international market. The responsibilities and expectations of BFAR became bigger when it was elevated again to a line agency in 1998 pursuant to Republic Act 8550 otherwise known as the "Philippine Fisheries Code of 1998". Thus, SDP was conceptualized to implement a well coordinated industry with responsive projects and activities on seaweeds both at the national and regional levels. The Program is designed to strengthen BFAR meeting the needs and challenges that beset the Philippines seaweed industry.

Objectives

The long range objective of SDP is to enhance the BFAR R&D projects/activities on seaweed for its further development to be able to address the issues and concerns of the seaweed industry.

The short range objectives are to put all seaweed related projects and activities under one umbrella, to establish linkages with the other sectors of the industry, and to facilitate transfer of technologies to end users, particularly the small seaweed farmers, processors and entrepreneurs.

Opportunities

The seaweed industry is now considered the sunrise industry because of its strengths and many opportunities for the Philippines. In the new millennium, it is expected that the Philippines will continue its leading position in the international market of *Kappaphycus* and carrageenan.

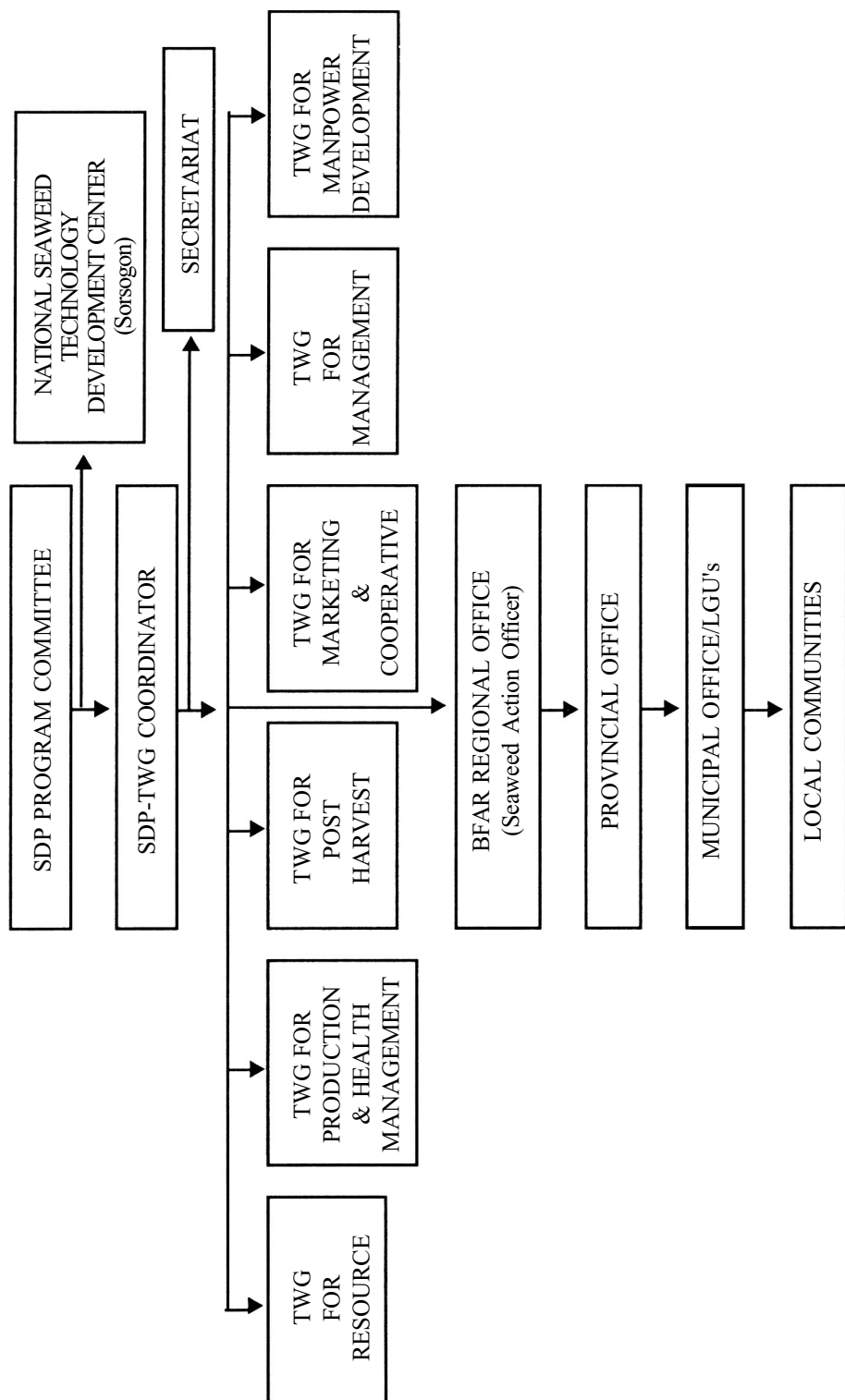


Figure 1. Organizational structure for the implementation of the Seaweeds Development Program (SDP)

through: expansion of production areas; big demand for quality seedlings; big demand for raw materials and carrageenan in the international market; more potential seaweeds with economic uses; revitalized Seaweed Industry Association of the Philippines (SIAP); and stronger linkage and collaboration of all sectors of the industry.

Issues and concerns

The BFAR is very much aware that together with the potentials and many opportunities are the problems and concerns of the seaweed industry. The major problems and concerns that need to be addressed are the following: deteriorating quality of the seedlings/stocks; declining farm productivity; poor quality of dried raw materials; seaweed diseases; substandard post-harvest handling and drying techniques; unstable buying and pricing practices; lack of credit assistance to the seaweed farmers; and lack of regulation on seaweed culture and management.

Program framework

To achieve the goals of the SDP and address the problems that beset the seaweed industry, BFAR came up with a program framework which consists of the following components:

A. Research and Development

1. Resources

- assessment and biological studies

2. Production

- laboratory and field researches
- development and improvement of farming technologies
- establishment of techno-demo farms and seaweed nurseries
- site assessment potential for seaweed farming
- health management of seaweeds

3. Processing

- biotechnology
- production of phycocolloids
- improvement of seaweed processing plant/facilities
- improvement of post-harvest technology
- development of value-added products

4. Marketing

- promotion of market matching
- assistance to private sector in credit availment

B. Management Component

- Resource management schemes
- Information and educational campaign
- Review of laws and regulations

C. Manpower Development

- Inventory of national capabilities
- Training of manpower

D. Institutional Development

- Improvement of BEAR facilities
- Establishment of satellite seaweeds R&D Centers

Highlights of accomplishment, CY 1996-2000

Creation of the National Seaweed Technology and Development Center (NSTDC) in Cabid-an, Sorsogon. The Center is tasked to undertake studies on biology, production ecology, processing and management of seaweed resources. The Center has established demo farms in 4 coastal areas in Sorsogon. The Center also developed value-added product such as fresh salad, pickled seaweeds and noodles. The agar derived from *Gracilaria* spp. was used as additive for macaroons, agar pie, jelly, jam, ice candy, fish embutido and tilapia sausages/frankfurter. The Center provides extension services on seaweed farming and processing to various cooperatives/association in Camarines Sur and rendered technical assistance to clienteles, such as the Local Government Units (LGUs), seaweed farmers, researchers and students.

Establishment of seaweed nurseries and techno-demo farms in selected coastal areas in the Philippines. The BFAR Regional Offices identified 66 possible sites for the establishment of seaweed nurseries nationwide. The nurseries serve as source of quality seedlings for distribution in nearby coastal areas/municipalities.

Assessment of seaweed resources in selected coastal areas has been done to determine the phenology of the sites. To date, the BFAR Seaweed Research Team conducted detailed assessment in Southern Leyte, Southern Palawan and CARAGA waters. Rapid resource assessment was done in selected provinces/regions, such as Regions 1, 2, 4, 5, 6, 7, 8, 9, 10 and 13. Various seaweeds were collected and identified during the assessment work. The economically important seaweeds recorded include *Acanthopora specifera*, *Caulerpa lentillifera*, *Codium* spp., *Gelidiella acerosa*, *Gracilaria* spp., *Halimeda* spp., *Halymenia durvillea*, *Hormophysa triquetra*, *Hydroclathrus*, *clathratus*, *Laurencia* spp., *Padina* spp. and *Sargassum* spp.

The BFAR collaborated with the Seaweed Industry Association of the Philippines (SIAP) by providing partial financial assistance for the toxicological study of Philippines iota and kappa carrageenan which were done in the Philippines and United Kingdom. The UK based BIBRA International completed its toxicological studies in conformity with the high standards of the Joint Experts Committee on Food Additives (JEFCA) guidelines and protocols. The report of BIBRA International did not raise any food safety issues against the Philippines *iota* and *kappa* carrageenan which became favorable to the country.

Formulation studies have been done and continuously being undertaken to come up with a standard procedure for good quality products. Standardization of drying techniques for seaweed has been started with test trials operation of a mechanical hot drier for *Gracilaria* spp. Value added

products from *Eucheuma*, such as seaweed candy, noodles (miki and canton style), cracknel-S, jams and marmalades; and tilapia sausage/frankfurter using agar (*Gracilaria* spp.) as extender have been started and in progress.

Produced information materials, i.e. flyer on Phil. Seaweed Resources and its Industry, and hand-outs/brochure on Eucheuma/Kappaphycus culture. The preparation of a National Seaweed Profile based on the Regional Seaweed Profiles submitted by the 14 Seaweed Action Officers has been started and continuously being updated.

Guidelines for market matching have been prepared and disseminated. Promotion of market matching has been undertaken in some areas. The directory of seaweed producers, buyers, processors/exporters has been prepared and continuously being updated.

The Program conducted Trainor's Training on seaweeds R&D to equip BEAR staff involved in the Program. The participants were given lectures and hands-on training on seaweed biology, culture, processing, marketing and management. Trainings and seminars on seaweed culture and processing were held and attended by the various stakeholders of the industry in the different regions.

The Program also actively participated in collaborative projects and activities, such as: ASEAN Industry Carraegeen Club, Integrated Seaweed Industry Development and Financing Program, 16th International Seaweed Symposium, First and Second Mindanao Seaweed Congress, National Seaweed Conference 2000 and 2001, and National Technical Committee for Seaweed and Carraegeenan. Following is the organizational chart of the National Seaweed Development

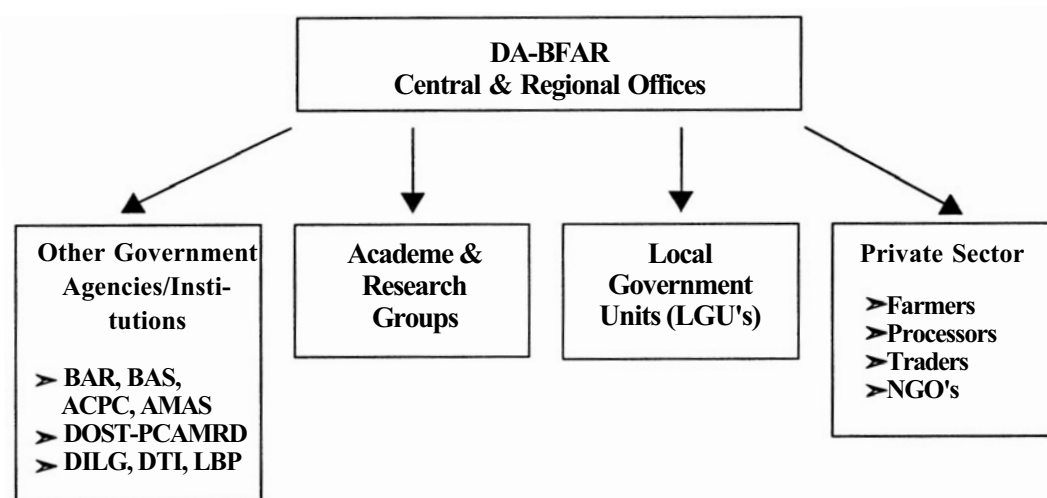


Figure 2. National Seaweed Development

Projects and activities for CY 2001*Research and Development*

- Rapid assessment of seaweed resources in selected coastal areas in the Philippines
- Development and improvement of production technologies
- Health management of seaweed
- Provision of post-harvest facilities
- Product development and standardization
- Market matching

Management

- Intensify IEC (production of information materials, dialogue/orientation with the LGU, etc.)
- Drafting of guidelines

Manpower Development

- Upgrading of BFAR Staff
- Training of various stakeholders of the seaweed industry

Institutional Development

- Upgrading of National Seaweed Technology Development Center (NSTDC) facilities
- Establishment of Seaweed Center

Recommendations

Continuation and revitalization of SDP is being recommended in order to address the present issues and problems of the seaweed industry and to meet the gaps on seaweeds R&D. In this regard, the following are recommended:

Resource

- R&D should focus on biological studies and genetics
- Diversify to other potential species with economic value

Production and Health Management

- R&D on the impact of seaweed farming
- Implementation of health management project
- Technical assistance in the formulation of Municipal Fishery Ordinance (MFO) and zonification
- Development of code of practice for seaweed farming
- Expansion of farming areas

Post-Harvest

- R&D on biotechnology, seaweed chemistry and microbiology, and utilization of by-products;
- Provision of post-harvest facilities
- Modern practices on seaweed product development;
- Provision on guidelines/regulation on GMP/SSOP in seaweed processing plant
- Conduct of Hazard Analysis Critical Control Points (HACCP) training
- IEC on village level processing, standards on raw material and carrageenan

Marketing and Cooperative

- Intensify the promotion of market matching
- Assist in the strengthening of SIAP
- Establishment of information data base
- Assist the seaweed farmers on credit availment
- Encourage seaweed farmers to organize themselves into cooperatives for proper access to seminars/trainings in the region.
- Initiate effective trade mechanism to stabilize the price of seaweed

Management

- Strengthen the information and education campaign to create awareness of the public through production of information materials and holding of dialogue/consultation with the local government units and local communities
- Review laws and regulations related to seaweeds farming and management including the zonation of farming areas according to resource use and distribution
- Create Committee to draft FAOs related to seaweed development, utilization and conservation
- Organize community-based management groups to be responsible for the management of the seaweed resources;
- Provide technical assistance in the formulation of municipal fishery ordinance

Manpower and Institutional Development

- Provide equipment and materials needed in the projects
- Develop degree and non-degree programs for BFAR Staff engaged in seaweed projects
- Continue upgrading of the BFAR technical capabilities on seaweeds R&D
- Conduct training for various stakeholders of the seaweed industry

Acknowledgement

For the support and active participation of those involved in the SDP, to wit: DA and BFAR Management, SDP Central and Regional Staff, other government agencies, academic and research institutions and the private sectors: SIAP, seaweed farmers, processors, entrepreneurs, researchers/students.